Argonne NATIONAL LABORATORY

Rare Isotope Accelerator

Rare Isotope Accelerator to Advance Science

The Rare Isotope Accelerator (RIA) will be the world's most powerful research facility dedicated to producing and exploring new rare isotopes that are not found naturally on Earth. It will help answer some of the fundamental questions of modern astrophysics and nuclear physics:

- What are the origins of the elements - oxygen, carbon, nitrogen, iron and the other building blocks of the universe and everything in it?
- What are the laws governing nuclear matter? The elements differ in the numbers of protons and neutrons that make up their nuclei.
- How do stars evolve, and how does their evolution affect the evolution of galaxies and planets?
- How much "ordinary" matter is there in the universe, and what is the rest made of?

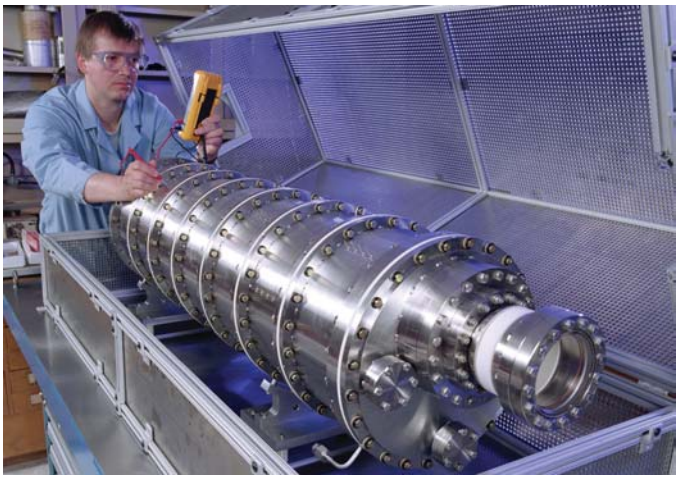
The U.S. Department of Energy (DOE) has placed RIA in a third place tie among 28 projects it listed as necessary to keep the United States at the forefront in scientific research. RIA's technology is well understood and its scientific potential well recognized and, of the top ranked projects, it is the one most ready to begin construction. DOE's Office of Nuclear Physics plans to build RIA during the next decade at a site yet that has to be determined. Argonne is among a number of scientific organizations preparing proposals to design, build and operate RIA.

RIA's Practical Applications

In addition to advancing basic research, RIA's will produce many practical advances and applications. Examples include:

Medicine and biology

- New, targeted treatments that deliver radioactive materials to attack tumors in specific parts of the body.



The "gas catcher cell" for RIA provides a new way to generate intense beams of short-lived, exotic nuclear isotopes for basic research.

- New, more sensitive radio-tracers for studying metabolism and other biological processes.

Advanced materials

- New and improved semiconductors for electronic applications.
- New, longer-lasting materials for medical implants and prosthetics.
- New materials with better resistance to wear and corrosion.

Environmental protection

- New, more sensitive methods to detect and identify trace pollutants in the environment.
- Improved ability to study the properties and behavior of radioactive elements in nuclear waste.

National security

- New methods to assess the condition of nuclear weapons without having to test them.
- A library of nuclear "fingerprints" to quickly identify materials used in nuclear devices and where they were produced.

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Argonne National Laboratory is a U.S. Department of Energy laboratory managed by The University of Chicago